

# PATENT SPECIFICATION

1,024,126

DRAWINGS ATTACHED.

1,024,126



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## COMPLETE SPECIFICATION.

### Improvements in Methods of Preparing Laminates.

SPECIFICATION NO. 1,024,126

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By a direction given under Section 17 (1) of the Patents Act 1949 this application proceeded in the name of WIGGINS TEAPE RESEARCH AND DEVELOPMENT a British Company, of Gateway House, 1 Watling Street, London, E.C.4.

THE PATENT OFFICE

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15 According to the invention there is provided a process for producing laminated fibrous sheets which comprises distributing finely divided substantially dry synthetic thermosetting resin over the upper surface of a base length of fibrous material, subjecting the resin on the base length of material to heat at a temperature sufficient to soften the resin and cause it to adhere to the base length of material, adhering a further length of fibrous material to the softened resin, applying further resin to the upper surface of the aforesaid further length of fibrous material and subjecting the resin to heat at a temperature sufficient to soften the resin and cause it to adhere to said further length of fibrous material, if necessary dividing the length of laminated material into sheet lengths, and applying heat and pressure to each laminated length or sheet length to effect consolidation thereof.

35 The expression "finely divided substantially dry synthetic resin" where used herein and in the appended claims is deemed to mean irregular resin particles whose greatest dimension is usually between 3 and 75 microns and the moisture content of which is usually between 3% and 6%.

40 The term "softened" when used herein and in the appended claims means that the

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0.004 to 0.012 inch. The decorative appearance may be effected by a pigment which is mixed in a dry powdered form with the resin applied to the upper surface of said further length of fibrous material, and an overlay length of translucent material be adhered to the heat softened resin applied to said further length of fibrous material to provide a protective, wear resistant surface to the consolidated laminate.

The overlay sheet may be made from wood fibre or rayon fibre paper.

The resin may be spray dried melamine formaldehyde resin.

The base length may consist of a plurality of laminated lengths of paper such as kraft paper, said base length being formed by distributing finely divided substantially dry phenol-formaldehyde resin over the upper surface of a first length of paper, subjecting the resin on said first length to heat at a temperature sufficient to soften the resin and cause it to adhere to the first length, adhering a second length of paper to the softened resin, and repeating the application of substantially dry phenol-formaldehyde resin and lengths of paper in the manner specified until the desired number of lengths of paper are laminated to form the base length.

The invention also contemplates laminate

Price 25p

sheet material produced by the process according to the invention.

In order that the invention may be clearly understood two embodiments thereof will now be described, by way of example, with reference to the accompanying diagrammatic drawings, in which:—

Figure 1 is a side elevation of a part of a machine for carrying out the process according to the invention,

Figure 2 is a side elevation of a modified form of the machine,

Figure 3 illustrates one form of laminated sheet material produced by the process according to the invention, and

Figures 4 and 5 illustrate alternative forms of laminated sheet material produced by the process.

In the drawings like references indicate like or similar parts.

Referring to Figure 1, a base length, shown as a continuous web 1, of fibrous material, such as paper, is drawn from a reel 2 and is moved lengthwise through the machine with a continuous movement at a constant predetermined linear speed. Finely divided substantially dry synthetic thermosetting resin, preferably spray dried melamine-formaldehyde resin, is distributed substantially evenly over the upper surface of the web 1 by a known form of distributing apparatus which comprises a vibrating sieve 3 supported by spring mountings 4. Resin is delivered to the sieve 3 by a chute 5 which receives the resin from a hopper 6 provided with an amplitude controlled vibrator, not shown. The height of the layer of resin delivered to the chute 5 is controlled by an adjustable gate 7.

When the layer of resin R, Figure 3, has been distributed over the web, the web and resin is moved beneath a source of heat which is arranged to heat the resin on the web to a temperature at which the resin softens and adheres to the web 1. The source of heat preferably consists of infra red heating means provided with a plurality of heater elements 8 extending transversely of the web 1 and which are supported to be about six inches above the web 1. While the resin is still soft a further length of fibrous material, in the form of a web 9 drawn from a reel 10, is engaged with the softened resin and is adhered thereto by passing the webs 1 and 9 between rollers 11, 12 which press the webs together.

The webs 1 and 9 are then passed beneath a further resin distributing apparatus 13, similar to that described above, which distributes a layer of resin R1, Figure 3, on to the upper surface of the web 9, and beneath a further source of heat, similar to that described above, which softens the resin and causes it to adhere to web 9.

In one embodiment of the invention the

length 9 of fibrous material may have a decorative appearance provided by printing or by pigment applied thereto before adhesion of the length 9 to the heat-softened resin R. In such instances there may, if desired, be an overlay length 14, as described below, Figures 1 and 4, applied to the heat-softened resin R1 and a further layer of resin R2, Figure 4, applied to the overlay length 14 and heat-softened to cause it to adhere to the overlay length 14. The overlay length 14 of material provides a protective, wear resistant surface to the laminate following consolidation thereof as described below.

The overlay length 14 is preferably a length of translucent paper made from wood fibre or rayon fibre and on consolidation of the laminate the resin R2 flows and saturates the fibrous material and becomes transparent.

In an alternative embodiment of the invention the decorative appearance is effected by a pigment which is mixed in a dry powdered form with the resin RIP, Figure 5, and in this instance an overlay length 14 of material is always used in order to avoid the condition known as "crazing". Figure 2 illustrates the method employed to produce this kind of laminate and in this embodiment of the invention the length 9 of material is preferably made from cellulose pulp and has a thickness of the order of from 0.004 to 0.012 inch.

The length 9 of material is drawn from reel 10 and is pressed against the softened resin on the base length 1 by the pressure rollers 11, 12. Melamine-formaldehyde resin is distributed over the upper surface of length 9 of material by a distributing apparatus 18, of the kind described above, and finely divided substantially dry pigment is distributed over the resin by a distributing apparatus 19. Next, a further layer of melamine-formaldehyde resin is distributed over the pigment by a distributing apparatus 20. The resin/pigment/resin layer is then softened by heating means 21 and an overlay length 14 of material is applied thereto, being drawn from the reel 15 and pressed against the softened resin/pigment/resin layer by the pressure rollers 16, 17. A layer of melamine-formaldehyde resin is then distributed over the upper surface of the overlay length 14 by a distributor apparatus 22 and is softened by heating means 23. The resin distributed over the length 9 of material is, as described above, melamine-formaldehyde or it may be a mixture of urea-formaldehyde resin and melamine-formaldehyde resin.

The overlay material 14 is preferably translucent paper made from wood fibre or rayon fibre and on consolidation of the laminate the resin flows and saturates the fibrous

4. A process according to Claim 2, wherein the decorative appearance is effected by a pigment and the pigment is mixed in a dry powdered form with the resin applied to the upper surface of said further length of fibrous material, and wherein an overlay length of translucent material is adhered to the heat-softened resin applied to said further length of fibrous material to provide a protective, wear resistant surface to the consolidated laminate, and a layer of resin is applied to the upper surface of the overlay length of material and is heat-softened to cause it to adhere to the overlay length of material.
5. A process according to Claim 4, wherein the overlay length of material is made from wood fibre or rayon fibre paper.
6. A process according to Claim 2 or Claim 3 or Claim 4 or Claim 5, wherein said further length of fibrous material is made from cellulose pulp.
7. A process according to Claim 6, wherein the thickness of said further length of fibrous material is of the order of 0.004 to 0.012 inch.
8. A process according to any one of Claims 1 to 7, wherein the resin is spray dried melamine-formaldehyde resin.
9. A process according to any one of Claims 1 to 8, wherein the base length consists of a plurality of laminated lengths of paper such as kraft paper, said base length being formed by distributing finely divided substantially dry phenol-formaldehyde resin over the upper surface of a first length of paper, subjecting the resin on said first length to heat at a temperature sufficient to soften the resin and cause it to adhere to the first length, adhering a second length of paper to the softened resin, and repeating the application of substantially dry phenol-formaldehyde resin and lengths of paper in the manner specified until the desired number of lengths of paper are laminated to form the base length.
10. A process according to any one of Claims 1 to 8, wherein the base length consists of a single length of hardboard, a plurality of laminated lengths of hardboard, or a length of vulcanised fibrous material.
11. Laminated sheet material produced by the process according to any one of Claims 1 to 10.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale*

